

EPITAXY OF III-V COMPOUND SEMICONDUCTOR

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Inventor(s): KOHAMA TAKETAKA; others: 01
Applicant(s): NIPPON TELEGR & TELEPH CORP
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Abstract

PURPOSE: A group-IV elementary semiconductor layer of the same as or different from the base semiconductor is allowed to grow epitaxially on the base surface, then a single atomic layer of a group V element is formed thereon, and a III-V compound semiconductor from the group V element used is allowed to grow thereon epitaxially whereby a high-purity semiconductor layer of III-V compound is formed.

CONSTITUTION: A Si crystal of $\langle 100 \rangle$ or $\langle 111 \rangle$ face orientation is used as a IV-group semiconductor base, and a group-IV semiconductor layer 2 the same as or different from the base such as Si or Ge is allowed to grow epitaxially so that the thickness of the layer becomes integral times that corresponding to double atom layer of the semiconductor. Then, a single atom layer 3 of group-V element such as P is formed by adsorption on its surface, further, a semiconductor layer 4 of III-V compound from the group V element used such as GaP is formed epitaxially thereon. The process enables the economical mass-production of high-quality III-V compound semiconductor layers free from antiphase boundary.